

April 29, 2005

Mr. Dave Cotnoir P.E.
Environmental Engineer
NAVFAC, Atlantic Division

Re: Response letter to "Navy Comments to Draft TMDL for the Chowan River Basin"

Dr. Mr. Cotnoir:

Thank you for your comments concerning the draft Chowan Basin bacteria TMDL report. Your comments were reviewed by MapTech Inc., the DEQ TMDL Program Office in Richmond, as well as the Tidewater Regional Office Water Planning section in Virginia Beach. The attached document includes the original comments and a response from DEQ and MapTech Inc. following each comment.

Your time and effort spent on this partnership with the Commonwealth of Virginia has been greatly appreciated. As stewards of the environment, we hope to continue working with all stakeholders in this endeavor and encourage your participation in implementing this TMDL once it has been approved by EPA and the State Water Control Board.

Sincerely,

Jennifer S. Howell
Water Quality Planner
Virginia Department of Environmental Quality
Tidewater Regional Office

Comment Response Document Addressing Comments on the Draft TMDL for the Chowan River Basin Provided by the Navy

1. General: Agree that given the uncertainties and assumptions inherent in the TMDL development process BMPs should be implemented in an iterative process.

- No response necessary.

2. Page 2-4, Table 2.1: The TMDL endpoints for London Bridge Creek and Upper West Neck Creek are based on Enterococci due to designation of these stream segments as estuarine waters in the Water Quality Standards Regulation. However, the discharges from NAS Oceana and many of the areas of the VB MS4 discharge to free flowing (albeit low flow) freshwater streams that ultimately lead to these segments that are classified as salt water. Since the modeling indicates that the Lynnhaven Bay waters are a key contributor to the elevated concentrations of Enterococci in London Bridge Creek and to a lesser extent Upper West Neck Creek, it may be possible that E. coli standards are met in these freshwater tributaries. If this is the case, are extensive BMPs may not be warranted in these areas. Will this issue be addressed during the implementation stage of the TMDL? Although, it does not appear that monitoring of the MS4 discharges or freshwater tributaries will be required as part of TMDL implementation, if that decision is revisited, DEQ should consider monitoring those locations for E. coli rather than Enterococci.

- Using a watershed approach to water quality means that all upstream inputs must be considered, however, one element of implementation is targeting of efforts to areas that will have the greatest impact. Additional, more spatially refined, monitoring is one method of prioritizing implementation efforts.
- As stated, the classification of these segments as saltwater/transitional rather than freshwater is part of the Water Quality Standards (WQS) Regulation. Therefore, the TMDL endpoint must be enterococci. The WQS Regulation would need to be changed in order to assess these segments against E. coli. If you consider such a change to be appropriate, we encourage you to work with the Office of Water Quality Program's water quality standards section. You can contact Ms. Elleanore Daub at 804.698.4111 to discuss this process.

3. Pages 2-21 and 2-22, Table 2.2: Suggest revising the stream names in this table to indicate whether the four monitoring stations for West Neck Creek are in the Upper West Neck Creek segment or the Middle West Neck Creek segment.

- This change will be made in the report.

4. Page 2-35, Table 2.18: This table shows load weighted average proportions of fecal bacteria from various sources. These averages can be misleading, particularly for station 5BWNC010.02 where the analysis does not account for flow due to the lack of reliable flow data at this station. Despite the high proportion of bacteria attributed to livestock (92%) at this station in this table, Table 2.15 only shows livestock as the dominant source

in 4 of the 12 sampling events. One was in the winter, one was in the late spring, and 2 were in the summer so there appears to be no seasonal influence. Efforts should be made to investigate the reasons for the variable nature of the dominant sources at this station so that BMPs can be targeted for all appropriate sources.

- Recognizing that it is difficult to draw major conclusions from 1 year's worth of monthly samples, it is probably not appropriate to characterize Table 2.18 as misleading. Continuing with station 5BWNC010.02 as an example, livestock was the dominant contributor in 1/3 of the samples, as pointed out above. Livestock was more persistently present in samples collected than any other source. Of the four samples where livestock was dominant, two of them had the highest concentrations recorded during the study period (almost 10 times greater than the next highest recorded value). The overall proportion of livestock (92%) calculated and presented in Table 2.18 is representative of the time period studied. Additional monitoring would help to refine these numbers and provide some measure of seasonality.

5. Page 3-1, Section 3.1: Land use coverage was developed from satellite images taken between 1990 and 1994. There have been significant land use changes in the Upper West Neck Creek Watershed since 1994. If possible other sources of land use data (e.g. census bureau maps or City of VB imagery) should be used to update land uses in this watershed.

- The land use data used was reflective of the land use in the watershed during the assessment period that resulted in the streams being put on the 303(d) list, and the time period used for calibrating the model. Loads were updated to current conditions based on US Census data and agricultural statistics before allocations were determined.

6. Page 3-19, Table 3.12: The horse population in the Upper West Neck Creek watershed shown in this table is equal to the horse population of the NAS Oceana stables. At least one other horse stable appears to be in this watershed. Request that the horse population be revisited for this watershed.

- Horse populations were estimated with the best available data from stakeholders. These populations were then presented for review by stakeholders. While the population numbers may not account for each animal in the watershed, they are considered to be adequately representative of conditions in the watershed for modeling purposes. During the TMDL Implementation Plan (IP) development process, these numbers can be refined and updated.

7. Page 3-21, Section 3.3.4: After table 3.5, it is stated that horses, sheep, donkeys, and goats were assumed to be in pasture 100% of the time. This assumption would seem to result in an overestimation of the loading rate from pastures since horses are in stables much of the time.

- While it is understood that horses are often stabled for periods of the day, a significant portion of their time is typically spent in pasture. Modeling the population as being in pasture 100% of the time gives a conservative estimate of the load from this source and supports the “implicit” margin of safety. If significant portions of the manure are deposited in stable areas, collected, and removed from the watershed or composted before being spread on the landscape, then the impact of these practices can be considered during the IP development.

8. Page 3-25, Table 3.19: The estimated seagull population for London Bridge Creek/Canal #2 of 104 birds seems low, particularly when compared to the seagull population of Upper West Neck Creek which was estimated to be 233. The London Bridge Creek watershed is a classical estuarine watershed while the Upper West Neck Creek watershed is further inland. Therefore, the seagull population would be expected to be significantly higher in the London Bridge Creek watershed.

- Waterfowl populations were based on analysis conducted for the Atlantic Flyway Breeding Waterfowl Plot Survey (Raftovich, 2004) and input from VA DGIF and the Director of the Center for Conservation Biology at William and Mary. According to our information there is no suitable habitat for *breeding* populations of seagulls in the study area. Non-resident populations were considered in the model. The same density of seagulls per acre of habitat was used throughout the study area. The difference in total numbers is due to the areas involved. Upper West Neck Creek has about twice as much seagull habitat as London Bridge Creek. Without specific data to the contrary, we feel that these numbers are reasonable.

9. Page 4-7, Table 4.2: Although residential land uses are subdivided into low intensity residential, high intensity residential, and urban/recreational in the third column of this table, these land uses are all assigned a percent impervious value of 80%. We expect that high density residential would have a significantly higher degree of impervious than low density residential. Similarly, commercial, industrial, and transportation land uses are shown as 80% impervious, even though we would expect their degree of imperviousness to be significantly higher than residential values. Recommend that DEQ refine the percent impervious values to more accurately reflect the varying imperviousness of these land uses.

- Due to model limitations it is necessary to consolidate some land uses and represent them with lumped parameters, based on area-weighted averages. Table 4.2 indicates that the “lumped” residential land uses were modeled as having **20%** impervious surfaces. The model interprets impervious surfaces as areas that are impervious and have a direct link to the stream. So, a rooftop with a downspout that discharges to a yard where there is opportunity for infiltration would not be considered impervious. The footnote at the bottom of the table indicates that the tidal section was modeled with 2 types of residential land use (*i.e.*, high density and low density – including urban/recreational grasses). While not indicated in

the table, high density residential was modeled with 50% impervious surfaces, and low density residential was modeled with 10% impervious surfaces.

10. Page 4-15, Section 4.3.3.2: It is stated that all horse and goat livestock were assumed to deposit all feces on pasture. Since horses spend a significant amount of time in stables, this assumption overestimates the true loading rate. Stable waste is generally collected and applied to the pasture but may be disposed of offsite. In the case where stable waste is collected and applied to pasture, the fecal coliform densities measured in stored manure should be used for the proportion of the land applied manure generated from the stables since they account for the die-off that occurs during storage. There would be no load for manure that is disposed of off site (in a different watershed).

- See response to comment #7.

11. Page 4-27, Section 4.6.1: There are some acronyms for HSPF parameters used in this section that are not defined (i.e. AGWRC and BASETP).

- These acronyms are defined in Table 4.10, but should be defined where they are first used. The report will be changed to include a definition of these acronyms where they are first used.

12. Page 4-76, Table 4.27: This table indicates that calibrated parameter values used for WSQOP and for MON-IFLW-CON were outside the typical ranges for these parameters. The text should explain why it is believed that these deviations are warranted (i.e. why other parameters were not adjusted to calibrate the model).

- The text explains the conditions leading to the resulting parameterization in the paragraph below Table 4.27.

13. Page 5-104, Section 5.2: In the second section, recommend replacing the word “Existing” with “Loading” since the loading conditions were adjusted.

- The term “Existing conditions” was used to indicate that we started with existing loads for determining allocations. The report will be changed to clarify the wording of this section.

14. Page 5-106, Section 5.2.2: It is stated that load reductions were performed by land use, as opposed to reducing sources. However, the next sentence states some of the sources that were reduced for the agricultural land use. Since it is sources that must ultimately be addressed in implementation, it may helpful to mention some specific source reductions for other land uses that were assumed in the scenarios.

- Reductions were performed by land use rather than sources because the majority of BMPs are implemented by land use. For instance, a stream buffer treating runoff from a cropland will address loads from all sources on the that cropland (e.g., land-applied manure, biosolids, and wildlife). Biosolids and imported

poultry litter were addressed specifically because these loads were considered to be less obvious, but their inclusion was not intended to exclude any other sources. The following change will be made:

Reductions on agricultural land uses (pasture and cropland) include reductions required for biosolids and imported poultry litter.

- Will be replaced with:

Reductions on land uses address all sources of fecal bacteria contributing to that land use. For instance, reductions on agricultural land uses (pasture and cropland) include, but are not limited to, reductions required for biosolids and imported poultry litter.

15. Page 5-122, Section 5.2.2.13: Please clarify the estimated contribution of storm water runoff in Middle West Neck Creek to the bacterial impairment. It was stated that both 25 to 35 % of the annual flow is from the North Landing River and that 65 to 75% of the average annual flow originates outside the direct contributing area.

- For clarification, the following change will be made:

However, Middle West Neck Creek shares hydrologic connectivity with Upper West Neck Creek (and consequently with London Bridge Creek and Lynnhaven Bay), and flow monitoring studies have shown that approximately 25 to 35% of the annual flow is northward (under these circumstances Middle West Neck Creek will actually receive flow from North Landing River). Given that approximately 65 to 75% of the average annual flow through this portion of West Neck Creek originates outside of the direct contributing area of Middle West Neck Creek, water quality in its boundary waters has a significant impact.

- Will be replaced with:

However, Middle West Neck Creek shares hydrologic connectivity with Upper West Neck Creek (and consequently with London Bridge Creek and Lynnhaven Bay), and flow monitoring studies have shown that flow is northward approximately 25 to 35% of the time (under these circumstances Middle West Neck Creek will actually receive flow from North Landing River). During the remaining portion of the year (65 to 75% of the time) the flow is in a southward direction. Because of this tidal connection, much of the flow through this portion of West Neck Creek originates outside of the direct contributing area of Middle West Neck Creek. As a result, water quality in its boundary waters has a significant impact (as described in greater detail in Section 4.7.4.

16. Page 5-124, Section 5.2.2.14: At the beginning of this section, it is stated that Upper West Neck Creek (UWNC) is included in the Chesapeake Bay/Atlantic Small Coastal

River Basins watershed. Later in the section, it is stated that a flow study at the southernmost reaches of UWNC concluded that approximately 65% of the average daily flow went southward into Middle West Neck Creek (MWNC). These two statements are contradictory. If the predominant flow of UWNC is southward to MWNC, it seems like the TMDL endpoint for UWNC should be E. coli rather than Enterococci.

- Regardless of the flow study, Upper West Neck Creek is officially listed in the 303(d) list as part of the Chesapeake Bay/Atlantic Small Coastal River Basins drainage area. This TMDL was developed based on the current listing. Please also refer to the response to comment #2.

17. Page 5-160, Table 5-28: Under London Bridge Creek in the Impairment column, the first MS4 permit should be permit MS4 VA0088676 and be identified as City of VB. The second MS4 permit (NAS Oceana) should be listed as permit VAR040043. The same identification scheme should be used for Upper West Neck Creek. Please provide the assumptions and calculations supporting the waste load allocations for the NAS Oceana MS4. This data will be helpful in identifying key sources where BMPs should be targeted during implementation.

- These changes to the table will be made. The load for each MS4 permit was modeled as the load from impervious surfaces within the boundaries of the area covered by the MS4 (*e.g.*, NAS Oceana) falling within the impairment drainage area. Reductions to existing NPS loads were applied to all affected land areas, regardless of the existence of an MS4 permit.

18. Page 6-12, Section 6.3.1. This section states that the watershed monitoring stations in the Chowan River basin will be sampled at a frequency of once every other month for a 2 yr period on a 6 yr rotating basis. Request that the stations in this watershed be sampled during the last two years of the 6 year period to allow time to implement some of the practices to reduce discharges from bacterial sources before monitoring occurs.

- DEQ will evaluate its ambient water quality monitoring schedule to try to accommodate this request.

19. Page 6-14, Section 6.3.3: In the second paragraph, there are several references to MS4 permittees revising their Storm Water Pollution Prevention Plans (SWPPPs). The SWPPP terminology is more applicable to storm water permits for industrial activities. The SWPPP equivalent in the MS4 program is “Storm Water Management Plan”. Please revise accordingly.

- This change will be made.

20. Page 7.5, Section 7.4: After Table 7.4, the stakeholders committee is discussed. Since the NAS Oceana has been assigned a waste load allocation for this TMDL, request that the Navy be explicitly listed as a member of the stakeholders committee.

- The Navy will be included.

April 29, 2005

Mr. H. Clayton Bernick, III
Environmental Management Programs Administrator
City of Virginia Beach
Planning and Community Development

Re: Response letter to "Chowan Basin TMDL Report"

Dear Mr. Bernick:

Thank you for your comments concerning the draft Chowan Basin bacteria TMDL report. Your comments were reviewed by MapTech Inc., the DEQ TMDL Program Office in Richmond, as well as the Tidewater Regional Office Water Planning section in Virginia Beach. The attached document includes the original comments and a response from DEQ and MapTech Inc. following each comment.

Your time and effort spent on this partnership with the Commonwealth of Virginia has been greatly appreciated. As stewards of the environment, we hope to continue working with all stakeholders in this endeavor and encourage your participation in implementing this TMDL once it has been approved by EPA and the State Water Control Board.

Sincerely,

Jennifer S. Howell
Water Quality Planner
Virginia Department of Environmental Quality
Tidewater Regional Office

Comment Response Document Addressing Comments on the Draft TMDL for the Chowan River Basin Provided by the City of Virginia Beach

1. The City offers no comments as to the applicability of the various hydraulic and hydrologic models as well as the bacterial source tracking method used in the preparation of the draft TMDL Report and will rely upon the scientific expertise of those persons within the Commonwealth of Virginia's agencies for such comments.
 - No response necessary.
2. The Commonwealth's List of Impaired Waters includes Hell Point Creek, Muddy Creek, and Beggar's Bridge Creek as being impaired by Fecal Coliforms and/or Enterococci, which are not included in this draft TMDL Report. Given the efficacy of watershed wide planning and implementation for water quality improvements, it is the opinion of the City that these waters should be included in the final Chowan TMDL Report. Also, Nawney Creek has been delineated by the Commonwealth on its List of Impaired Waters as upper and lower Nawney Creek; this draft TMDL Report refers only to Nawney Creek. The City suggests that this discrepancy also be addressed in the final Chowan TMDL Report to ensure consistency.
 - Hell Point Creek, Muddy Creek and Beggar's Bridge Creek are outside the watershed areas modeled for this project. Given that, it cannot be anticipated that the loadings developed under the current contract would be representative of these additional areas. However, the City may wish to consider the findings from the adjacent Nawney Creek TMDL in evaluating stream and watershed restoration activities for these waters.
 - The report will be changed to clarify the Upper and Lower Nawney Creek segment delineations.
3. While the fecal coliform/enterococci levels in many of the waters in the Chowan exceed fishable/swimmable, the fishable/swimmable standards may not be appropriate for most of these waters due to the presence of native wildlife species, which are not conducive to fishable/swimmable standards. These include numerous species of poisonous snakes, including copperheads, canebrake rattlesnakes, and water moccasins for extended periods of each year. Recreational contact standards may be more appropriate.
 - All Virginia waters are assigned a designated use as specified in water quality standards. As stated in the implementation chapter of the report, the Commonwealth recently adopted secondary contact recreation criteria for waters where the primary contact recreation criteria cannot be attained. However, in order to change the use, a use attainability analysis must be performed. Prior to such a UAA being utilized, anthropogenic influences

must be addressed. In essence, it must be proved that the waters cannot be restored to meet the designated use, or that the use never existed.

4. The freshwater bacterial standard for Milldam Creek and lower Nawney Creek may not be appropriate, as these waters are more accurately described as saltwater/transition zone waters. While not exhibiting full lunar tidal action, these waters are subject to wind tides and frequently have wide ranging salinity readings as a consequence.
 - Milldam Creek and Lower Nawney Creek were initially listed in 2002 and 1996 respectively for violations of the fecal coliform standard. The enterococci bacterial standard for saltwater/transition zones was not adopted into the Virginia Water Quality Standards until February 12, 2004. The TMDL is protective of both the fecal coliform and the E.coli/enterococci criteria.
 - The classification of any water as saltwater/transitional rather than freshwater is part of the Water Quality Standards (WQS) Regulation. The TMDL endpoint must reflect the classification as currently included in the WQS. The WQS Regulation would need to be changed in order to assess these segments against E. coli. If you consider such a change to be appropriate, we encourage you to work with the Office of Water Quality Program's water quality standards section. You can contact Ms. Elleanore Daub at 804.698.4111 to discuss this process.
5. The City requests that London Bridge Creek, Canal # 2, and Upper West Neck Creek be administratively considered part of the Lynnhaven Watershed for TMDL Implementation purposes once the final TMDL Report is approved by the U.S. Environmental Protection Agency and the State Water Control Board. This action would allow for a logical nexus between the implementation strategies developed for these headwater areas of the Lynnhaven watershed and the Lynnhaven Fecal Coliform TMDL Implementation Plan is currently under development by the Hampton Roads Planning District Commission under contract to DEQ. A map showing the watershed boundaries for the Chesapeake Bay and Chowan basins which is utilized by the City to delineate watershed boundaries for regulatory purposes is provided as Attachment 1.
 - It was always the intention of the Commonwealth that these waters be considered part of the greater Lynnhaven Bay watershed. Consequently, these waters were incorporated into the scope for the implementation plan development currently ongoing in the Lynnhaven Bay watershed.
6. Page 3-6 of the draft TMDL Report provides an Assessment of Point Sources, which does not clearly indicate that, the City's, and presumably the Navy's, MS4 systems do not include chlorination/dechlorination practices. The City suggests that this ambiguity be eliminated, as neither the City nor the Navy include

chlorination/dechlorination practices as part of their MS4 systems.

- This will be clarified in the document.
7. On page 3-11, Figure 3.6 refers to the VPA and CAFO permitted point sources in the Albemarle and Lynnhaven – Poquoson River Watersheds. However, it should be noted that the Barry Knight hog farm was acquired several years ago by the U.S. Fish and Wildlife Service as part of the Back Bay National Wildlife Refuge expansion program. Accordingly, the City suggests that this map be amended or eliminated as appropriate for the final TMDL Report.
 - MapTech used this operation for calibration runs, but removed it as part of updating the model to existing conditions, prior to doing allocation runs. The related verbiage will be reviewed and clarified as needed in the report.
 8. On page 3-19, Table 3.12 refers to 3,727 hogs in the Nawney's Creek subwatershed. This figure should be revised in accordance with comment 7 above.
 - See response to comment #7.
 9. On page 3-25, Table 3.19 refers to the wildlife populations in the TMDL area. The City is of the opinion that the populations of various species of wildlife (deer, geese, ducks, gulls) are considerably higher than suggested in the draft TMDL Report.
 - According to MapTech, deer populations were based on information from VA DGIF and adjusted (upward) for the Oceana NAS area, based on discussion with ONAS officials. Waterfowl populations were based on analysis conducted for the Atlantic Flyway Breeding Waterfowl Plot Survey (Raftovich, 2004) and input from VA DGIF and the Director of the Center for Conservation Biology at William and Mary.
 10. On page 4-12, Table 4.5 showing estimated failing septic systems, indicates a substantial number of failing septic systems and uncontrolled discharges (straight pipe discharges). The City requests the Commonwealth provide more information as to known failing septic systems and straight discharges and that the Virginia Department of Health take appropriate action to protect human health, safety, and welfare.
 - As described in the document, the number of failing septic systems and straight pipes is based on responses to US Census questions, indicating age of homes and sewage disposal method. These numbers were presented at TAC meetings for validation/correction. Individual sources were not identified in this study. In other TMDL areas, stream walks, public outreach/education, and septic pump-out/inspection programs have

been used successfully during implementation to identify specific occurrences. The data in the TMDL can be used to identify watersheds with a higher likelihood of failed septic systems or straight pipes (based on age of homes) and target stream walks or outreach efforts.

11. While the Quality Calibration Results for modeled and monitored Fecal Coliforms for the waters outside the City of Virginia Beach are generally in good agreement, the Quality Calibration Results for the waters within the City of Virginia Beach show poor agreement. The City concludes that this appears to be a result of the tide gauges used by necessity in the model development being an average of 40 to 50 river miles away from the modeled waters in Virginia Beach. In addition, the only wind data station utilized is Oceana Naval Air Station. Given this poor agreement between actual versus modeled conditions, the City concludes that the Bacteria Load reductions indicated may not be accurate for regulatory purposes, and suggests that the adopted TMDL may be a “first cut” at load reductions which will need refinement during the Implementation Phase. Accordingly, the City proposes that acquisition of tide and weather data collection devices in concert with the Commonwealth be considered during the Implementation Phase with the final adjusted allocations determined upon acquisition of adequate tidal and other weather data. The City will however simultaneously begin working with the Commonwealth to reduce known and controllable sources of fecal contamination (human, pets, livestock) within this TMDL area.

- Water quality model agreement in the Virginia Beach area is not likely to be negatively impacted by the hydrologic model, because the hydrologic agreement is good (Figure 4.40 and Table 4.22) at USGS station 02043200, which is located on West Neck Creek at Indian River Road. The more likely data complication with the water quality model is due to its sensitivity to the water quality boundary conditions. That is, the monitored fecal coliform concentrations at each end of the impaired stretch of water. An improvement in the model could conceivably be achieved through collection of fecal coliform samples at the boundary stations every day for an extended period (*e.g.*, a year), and use of those data as a boundary condition. However, in the absence of additional data, and considering that the boundary conditions are set to the geometric mean standard for allocation runs, the model results appear satisfactory.